



# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA1 | Euston - Station and Approach  
**Construction assessment (SV-003-001)**  
Sound, noise and vibration

November 2013

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# 1 Introduction

1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these is an introduction to the relevant policy and methodology (Volume 5: Appendix SV-001-000). This relates to the sound, noise and vibration assessment for all community forum areas (CFA).

1.1.2 For the Euston – Station and Approach community forum area (CFA01), the other three sections are as follows:

- baseline sound, noise and vibration (Volume 5: Appendix SV-002-001);
- construction sound, noise and vibration (Volume 5: Appendix SV-003-001) (this appendix); and
- operational sound, noise and vibration (Volume 5: Appendix SV-004-001).

1.1.3 The outcomes of the assessment are summarised in CFA Report 01, Euston – Station and Approach (CFA Report 01), Section 11.

1.1.4 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 5, Sound, Noise and Vibration Map Book.

1.1.5 This appendix presents the likely noise and vibration impacts, effects and significant effects arising from the construction of the Proposed Scheme for the Euston – Station and Approach area on:

- people, primarily where they live ('residential receptors') in terms of:
  - individual dwellings;
  - on a wider community basis, including any shared community open areas; and
- community facilities such as schools, hospitals, places of worship, and also commercial properties such as offices and hotels, collectively described as 'non-residential receptors' and 'quiet areas'.

1.1.6 The assessment of likely impacts, effects and significant effects from construction noise and vibration on community, ecological or heritage receptors and the assessment of tranquillity are presented in the following documents within Volume 5:

• Community	Appendix CM-001-001
• Ecology	Appendix EC-005-001
• Heritage	Appendix CH-003-001
• Landscape and Visual	Appendix LV-001-001

## 1.2 Evaluation of impacts and effects

1.2.1 This appendix provides a quantitative assessment of construction noise and vibration impacts/effects and a qualitative assessment of likely significant effects, based on the

impacts/effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

- 1.2.2 Indirect effects arising from temporary changes in traffic patterns on the existing road network as a consequence of constructing the Proposed Scheme are also reported in this appendix, where they will occur within the study area (as defined in Volume 5 Appendix SV-001-000).
- 1.2.3 In undertaking the assessment of noise and vibration, consistent with Environmental Impact Assessment (EIA) Regulations and emerging National Planning Practice Guidance<sup>1</sup> a differentiation between impacts effects, adverse effects and significant effects is made. Further information is provided in Appendix SV001-000.
- 1.2.4 The assessment of impacts and effects has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The Assessment Locations employed in this assessment are presented in Map SV-03-001 (Volume 5, Sound, Noise and Vibration Map Book).

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<sup>1</sup> Information is provided in the Department for Communities and Local Government's emerging National Planning Practice Guidance – Noise <http://planningguidance.planningportal.gov.uk>, (refer to the noise exposure hierarchy), as available on 14th October 2013.

## 2 Scope, assumptions and limitations

### 2.1 Regional and local policy guidance

2.1.1 The policy framework for sound, noise and vibration is set out in Volume 1 and in Volume 5: Appendix SV-001-000. As part of the engagement with local authorities through the Planning Forum Sub Group - Acoustics, information regarding any specific local planning guidance in respect of noise and vibration has been requested. Whilst no information has been received for this study area via the Planning Forum Sub Group - Acoustics, the following local policy guidance on noise and vibration has been identified:

- Camden Local Development Framework - Nov 2010

2.1.2 This guidance has been considered as part of formulating the detailed application of the impact and significance criteria set out in Volume 5: Appendix SV-001-000.

### 2.2 Engagement

2.2.1 Details of engagement on a route-wide basis with the local and county authorities' Environmental Health Practitioners via the Planning Forum Sub Group - Acoustics, is set out in Volume 1.

2.2.2 Engagement with communities has been via the Community Forums, as set out in Volume 1. In respect of sound, noise and vibration the following discussions have taken place:

- general discussions in respect of local issues, including possible ways to avoid and mitigate the potential impacts of noise or vibration;
- September / October 2012: a specific presentation about sound, noise and vibration with discussion afterwards with one of the project team specialists;
- November / December 2012: specific request for the Community Forum regarding baseline sound monitoring locations;
- January / February 2013: feedback to the Community Forum on any proposed baseline monitoring locations; and
- verbal / written responses to questions and sound, noise and vibration.

### 2.3 Methodology

2.3.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1). Further clarification regarding specific areas is presented in the SMR addendum (Volume 5: Appendix CT-001-000/2). Further information is contained in Volume 5: Appendix SV 001-000.

- 2.3.2 In this area construction of the Proposed Scheme includes building complex major engineering structures over a wide area including utility diversions, demolitions, excavations, retaining wall construction, bridge replacements, and construction of the extended station facilities.
- 2.3.3 This assessment considers the noise contributions from all the main activities required to construct the Proposed Scheme. Through extensive liaison with the construction engineering team, a noise model was created comprising approximately 450 activity locations, each comprising of up to 20 items of construction plant. The noise levels from all these activities were predicted for each month of the assumed construction programme to give cumulative noise levels at each assessment location from all activities likely to occur simultaneously.
- 2.3.4 The assessment of effects has been undertaken at approximately 100 assessment locations that are each representative of a number of dwellings or other sensitive receptors.
- 2.3.5 The design of the Proposed Scheme has evolved since the completion of the construction noise assessment. The changes, however, mainly affect the programming of works and are unlikely to affect the significance of the effects identified.

## **2.4 Assumptions**

- 2.4.1 Route-wide assumptions are outlined in Volume 1 and are further detailed in Volume 5: Appendix SV-001-000. Local assumptions that apply to the assessment of construction sound noise and vibration within this area are set out in Volume 2: CFA Report 01.

## **2.5 Limitations**

- 2.5.1 The route-wide limitations and the approach adopted to assure that they will not impact the robust assessment of sound, noise and vibration are presented in Appendix SV-001-000.

## 3 Environmental baseline

### Existing baseline

3.1.1 Baseline sound level data has been collected at locations representative of the airborne sound-sensitive receptors. The existing and future baseline airborne sound levels derived from these measurements are given in Volume 5: Appendix SV-002-001. Details of the baseline data collection and the methodology are given in Volume 5: Appendix SV-001-000 and specifically for this study area in Volume 5: Appendix SV-002-001.

### Future baseline

3.1.2 The assessment of noise from construction activities assumes a baseline year of 2017 which represents the period immediately prior to the start of the construction period. As a reasonable worst case, it has been assumed that no change in baseline sound levels will occur between the existing baseline (2012/13) and the future baseline year of 2017. The assessment of noise from construction traffic assumes a baseline year of 2021, representative of the middle of the construction period when the construction traffic flows are expected to be at their peak. Further information can be found in the Traffic and Transport assessment (Volume 5: Appendix TR-001-000).

## 4 Effects arising during construction

### 4.1 Introduction

4.1.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts and effects are presented. This is followed by the identification of significant effects and the evidence used to support these conclusions.

4.1.2 The structure of this assessment report is:

- Avoidance and mitigation measures
- Quantitative identification of impact and effects
  - Ground-borne sound and vibration
    - residential
    - non-residential
  - Airborne sound
    - residential
    - non-residential
- Assessment of impacts and effects
  - residential receptors: direct effects – dwellings
  - residential receptors: direct effects – communities
  - residential receptors: indirect effects
  - on-residential receptors: direct effects
  - non-residential receptors: indirect effects
  - cumulative effects from the Proposed Scheme and other committed development

### 4.2 Avoidance and mitigation measures

4.2.1 These measures are set out in Volume 2: CFA Report 01.

4.2.2 In addition, there will be several construction compounds around the perimeter of the Euston site that will be occupied for some years. These compounds will serve various functions, the majority of which will not be major noise sources. Unlike works areas, where the locations of noisy activities are largely dictated by the scheme design, in the compounds there is some flexibility as to how the different facilities are laid out. Therefore, where these are in close proximity to noise sensitive receptors the layout of the compounds will be used to minimise noise impacts.

4.2.3 The National Temperance Hospital compound is adjacent to the Maria Fidelis School. It will house worker facilities include offices, storage and canteens. These temporary buildings will not generate high levels of noise and will be positioned to provide screening of noise emission to the school and its neighbours.

4.2.4 Similarly stacked portacabins will be used on the Regents Park Estate satellite compound to reduce noise impacts to adjacent housing.

4.2.5 The layout of the Hampstead Road Bridge satellite compounds and the Royal Mail NW1 Delivery Office satellite compound will similarly be designed to reduce noise emissions to housing in Mornington Terrace, Mornington Crescent, and the Ampthill Estate.

4.2.6 Before construction begins, the contractor will be required to predict noise levels for the Section 61<sup>2</sup> application to the local authority. It is likely that in many cases quieter methods of working and specific on site noise mitigation measures will be available. For example, mobile noise barriers located close to noisy plant can usually reduce noise levels at adjacent properties by at least 5dB. The result will be lower noise impacts than reported in this ES.

## 4.3 Quantitative identification of impacts and effects

### Ground-borne vibration

4.3.1 Assessment locations defined for the quantitative assessment of impacts are shown in Map SV-03-001 (Volume 5, Sound, Noise and Vibration Map Book).

4.3.2 The ground-borne vibration assessment considers the effects of the following activities in this area:

- vibratory compaction of structural earthworks;
- vibratory piling; and
- ballast compaction .

4.3.3 There is no requirement for vibratory compaction of earthworks in the Euston area. The use of vibratory rollers for more minor works, such as road surfacing, reinstatement after utility diversions etc. have been scoped out of the assessment based on the limited nature and duration of such works.

4.3.4 The majority of piling required to construct retaining walls, bridges and other structures will be continuous flight auger piling, which is not a significant source of vibration. Vibratory piling techniques are expected for some bridge piers. The relevant prediction method for the proposed type of piling as detailed in BS5228-2:2009<sup>3</sup> has been adopted.

<sup>2</sup> Section 61 Agreement under the Control of Pollution Act, 1974 (c.40). London, Her Majesty's Stationery Office.

<sup>3</sup> British Standard 5228: 'Code of practice for noise and vibration control on construction and open sites: Part 2: Vibration', British Standards Institution, 2009.

4.3.5 Pneumatic breakers are commonly required to break up existing concrete structures during demolition works. The use of such equipment can generate perceptible vibration. However, the impact is limited to a small area in very close proximity of the equipment. Based on the limited extent and duration of such works a quantitative assessment of vibration from pneumatic breakers is not considered to be required.

4.3.6 Subject to the screening distances identified in the SMR, the likely impacts and significant effects from construction vibration have been considered for residential receptors, both as individual dwellings and communities, and non-residential receptors.

4.3.7 The area around the construction work planned at Euston comprises numerous buildings with diverse uses. Information regarding the number and use of all sensitive receptors was based upon the best available data at the time of assessment. It is possible that in locations where effects are identified the number of affected receptors and the type of effect may vary. A worst case approach has been taken and wherever possible and the most sensitive likely receptor has been assumed.

4.3.8 In Table 1 the number of impacts represented column identifies the number of receptors likely to be subject to construction vibration levels above the impact criteria. The assessment location itself may be representative of a greater number of receptors but due to a range of factors (including building orientation and increased distance from the source of the vibration) not all the receptors represented would be likely to be impacted. In Table 2 the number of impacts column has been left blank and information regarding the relevant receptors is included in the area represent column.

4.3.9 For each assessment location, the assessment results for residential and non-residential receptors are presented in Table 1 and Table 2. Explanation of the information in Table 1 and Table 2 is provided in Volume 5: Appendix SV-001-000, with the following additional notes:

Where the significant effect column is highlighted, then a significant effect is identified at the referenced community, or individual receptor.

- \* Significant effect – the quantitative impact methodology has identified either:
  - 1) no impact at this receptor but further information (see assessment) has identified that a significant effect is nonetheless likely; or
  - 2) an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not give rise to a significant effect.
- ~ Significant effect – impacted dwellings which are either spatially remote from larger defined residential areas, or a small number of dwellings whose impact is not considered to represent the larger defined residential area, and as such are not considered to be part of a community significant effect.

- A Type of effect – annoyance
- D Type of effect – disturbance
- Sd Type of effect – sleep disturbance
- Q Type of effect – deterioration of acoustic quality

R      Type of receptor – residential

V<sub>1</sub>    Type of receptor:

(V<sub>1</sub>) vibration sensitive research and manufacturing, hospital, and university equipment;

(V<sub>2</sub>) hotels, hospital wards and education dormitories;

(V<sub>3</sub>) offices, schools and places of worship; or

(V<sub>4</sub>) workshops.

T      Receptor design – typical

S      Receptor design – special

Table 1: Assessment of construction induced ground-borne vibration at residential receptors

Assessment location		Impact criteria				Significance criteria									Significant effect	
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Typical/highest monthly indoor vibration dose value (VDV) [m/s <sup>1.75</sup> ]		Construction activity resulting in highest forecast vibration levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [m]	Mitigation effect		
			Day (0700-2300)	Night (2300-0700)												
521033	Park Village East (Cubitt Court)	0.67	-	0.27/0.27	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	40	R	T	-	-	Y	1.3	-	CSV01-Co2	
535544	Augustus Street, London	0.60	-	0.23/0.23	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	15	R	T	-	-	Y	1.3	-	CSV01-Co6	
545326	Mornington Crescent	0.75	-	0.31/0.31	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	20	R	T	-	-	Y	1.3	-	CSV01-Co3	
700387	Stanhope St (north)	0.79	-	0.32/0.32	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	60	R	T	-	-	Y	1.3	-	CSV01-Co2	
700388	Harrington Street, Langdale House	0.55	-	0.21/0.21	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	60	R	T	-	-	Y	1.3	-	CSV01-Co6	
545919	Ampthill Estate	1.22	-	0.54/0.54	Bridge construction - construction of new bridge pier (night-time works) - vibratory	S	80	R	T	-	-	-	0.7	-	*	

Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Typical/highest monthly indoor vibration dose value (VDV) [m/s <sup>1.75</sup> ]		Construction activity resulting in highest forecast vibration levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [m]	Mitigation effect		
			Day (0700-2300)	Night (2300-0700)												
					piling rig											
535446	Hampstead Road, Cartmell House (north)	1.58	0.8/0.8	-	Bridge construction - construction of new bridge pier (daytime works) - vibratory piling rig	S	60	R	T	-	-	Y	1.5	-	CSV01-Co6	
535454	Harrington Street, Conniston House	1.32	0.65/0.65	-	Bridge construction - construction of new bridge pier (daytime works) - vibratory piling rig	A	80	R	T	-	-	Y	1.5	-	CSV01-Co6	
535501	Harrington Street, Langdale House	0.67	0.3/0.3	-	Bridge construction - construction of new bridge pier (daytime works) - vibratory piling rig	A	30	R	T	-	-	Y	1.5	-	CSV01-Co6	
700389	Hampstead Road, Cartmell House (south)	0.74	0.33/0.33	-	Bridge construction - construction of new bridge pier (daytime works) - vibratory piling rig	A	70	R	T	-	-	Y	1.5	-	CSV01-Co6	
528830	Park Village East (north)	0.85	-	0.35/0.35	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	4	R	T	-	-	Y	3	-	CSV01-Co2	
528856	Park Village East (north)	0.71	-	0.29/0.29	Bridge construction - construction of new bridge pier (night-time works) - vibratory	A	2	R	T	-	-	Y	3	-	CSV01-Co2	

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Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Typical/highest monthly indoor vibration dose value (VDV) [m/s <sup>1.75</sup> ]		Construction activity resulting in highest forecast vibration levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [m]	Mitigation effect		
			Day (0700-2300)	Night (2300-0700)												
					piling rig											
529041	Mornington Terrace	0.72	-	0.29/0.29	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	25	R	T	-	-	Y	3	-	CSV01-Co3	
529064	Mornington Street	1.56	-	0.72/0.72	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	S	35	R	T	-	-	Y	3	-	CSV01-Co3	
529185	Mornington Terrace	0.55	-	0.21/0.21	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	A	20	R	T	-	-	Y	3	-	CSV01-Co3	
529201	Mornington Terrace	1.11	-	0.48/0.48	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	S	35	R	T	-	-	Y	3	-	CSV01-Co3	
700384	Mornington Terrace	1.89	-	0.9/0.9	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	S	10	R	T	-	-	Y	3	-	CSV01-Co3	
700386	Park Village East (north)	1.01	-	0.43/0.43	Bridge construction - construction of new bridge pier (night-time works) - vibratory	S	2	R	T	-	-	Y	3	-	CSV01-Co2	

Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Typical/highest monthly indoor vibration dose value (VDV) [m/s <sup>1.75</sup> ]		Construction activity resulting in highest forecast vibration levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [m]	Mitigation effect		
			Day (0700-2300)	Night (2300-0700)												
					piling rig											
534557	Cobourg Street	3.11	1.78/1.78	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	S	45	R	T	-	-	-	0.75	-	*	
534765	Cobourg Street	0.56	0.24/0.24	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	A	40	R	T	-	-	-	0.75	-	*	
535017	Varndell Street	1.83	0.96/0.96	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	S	1	R	T	-	-	-	0.5	-	*	
700394	Robert Street (east end)	0.53	0.23/0.23	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	A	100	R	T	-	-	-	0.5	-	*	

\* Impacts with durations of less than 1 month are not generally considered significant.

Table 2: Assessment of construction induced ground-borne vibration at non-residential receptors

Assessment location		Impact criteria				Construction activity resulting in highest forecast vibration levels	Significance criteria							Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Typical/highest monthly indoor vibration dose value (VDV) [m/s <sup>1.75</sup> ]		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [m]	Mitigation effect	
536408	Euston Road, (School of Arts)	0.40	0.16/0.16	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	B	-	V1	T	-	-	0.75	-	-
534557	Cobourg Street, (Society of College National and University libraries)	3.11	1.78/1.78	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	B	-	V3	T	-	-	Y	0.75	-
535544	Augustus Street, (Regents Park Children's Centre Nursery)	0.60	-	0.23/0.23	Bridge construction - construction of new bridge pier (night-time works) - vibratory piling rig	B	-	V3	T	-	-	1.3	-	-
534765	Cobourg Street, (Exmouth Arms Public House)	0.56	0.24/0.24	-	Pipe jacking - pile and excavate jacking and receiving pits - vibratory piling rig	B	-	V3	T	-	-	0.75	-	-
700391	1-9 Melton Street,	0.83	0.38/0.38	-	Pipe jacking - pile and excavate jacking and receiving pits -	B	-	V3	T	-	-	0.75	-	-

Assessment location		Impact criteria				Significance criteria							Significant effect		
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Typical/highest monthly indoor vibration dose value (VDV) [m/s <sup>1.75</sup> ]		Construction activity resulting in highest forecast vibration levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [m]	Mitigation effect	
			Day (0700-2300)	Night (2300-0700)											
	(offices)				vibratory piling rig										

\* Impacts with durations of less than 1 month are not generally considered significant.

### *Residential*

4.3.10 The assessment of impacts due to ground-borne vibration from the construction of the Proposed Scheme has identified temporary significant effects on groups of dwellings around the works falling into three community areas.

4.3.11 With reference to Table 1, the assessment has identified that there are no dwellings for which the expected levels exceed the vibration impact criteria for buildings of 6 mm/s PPV.

4.3.12 Likely significant effects from construction vibration are predicted in three community areas; CSVo1-C2 Park Village East, CSVo1-C3 Mornington Terrace and CSVo1-C6 Regents Park Estate, as illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book). No likely significant effects are predicted in the other community area or in other areas where utility diversion works are required because, although vibration may be perceptible, the durations of impacts will be less than a month.

4.3.13 In Park Village East and the Mornington Terrace areas (CSVo1-C2 and CSVo1-C3), vibration effects may be experienced intermittently during a period of up to approximately three months at dwellings near the Mornington Street Bridge work which may require vibratory piling during the night-time. In the Regents Park Estate area (CSVo1-C6) vibration effects may be experienced intermittently during a period of up to approximately two months at dwellings nearest the Hampstead Road Bridge work which may require vibratory piling during both the daytime and night-time. The typical community response to a minor vibration impact will be a low probability of adverse comment. Combined with simultaneous airborne noise impacts, the effects on these dwellings are considered to be a change in the acoustic character of the area and hence be perceived as an adverse effect on the quality of life. In combination these individual effects are considered significant.

4.3.14 Elsewhere vibration may be perceptible during various works, such as utility works, demolition and road surface compaction, but for periods of less than a month. No percussive piling is expected in the Euston area.

### *Non-Residential*

4.3.15 The area around the Euston works has various non-residential uses including offices, shops, schools and churches, often alongside and below residential properties. These have been assessed through predictions of likely levels of ground vibration during those works most likely to generate vibration, as described above, and comparing the likely levels with the assessment criteria laid out in Volume 5: Appendix SV-001-000. Where non-residential receptors are located on roads where utilities works will be carried out it is expected that the duration of associated vibration impacts will be less than one month and will not give rise to significant annoyance effects within the building.

4.3.16 Consideration of the likely vibration levels from construction of the Proposed Scheme, the sensitivity of the receptor, the magnitude of the impact, and other significance

criteria as set out in Volume 5: Appendix SV-001-000 has resulted in the identification of a likely significant effect on the following non-residential receptors on a precautionary basis.

- University buildings in the Cobourg Street and Euston Road areas could potentially house sensitive research equipment when the work takes place. Prior to works commencing manufacturers' safe operating limits will be established if such equipment is identified and monitoring will be carried out to monitor levels.
- Two audio-visual studios have been identified in the area whose businesses may require the use of equipment that could be affected by ground vibration. The Park Village Studio in Park Village East and the Maverick TV Studio in Churchway could be affected depending on the equipment in use at the time of the works. In Churchway only utility works are required, so that impacts should be less than a month in duration. In Park Village East works are required in addition to utility works that could lead to longer duration impacts. Prior to works commencing manufacturers' safe operating limits will be established if such equipment is identified and monitoring will be carried out to monitor levels.

### **Airborne sound: direct impacts and effects**

4.3.17 Activities associated with the construction phases of the Proposed Scheme will generate airborne noise. The assessment of the likely impacts and significant effects as a result of the construction noise has considered the effects on:

- residential receptors, both as individual dwellings and communities; and
- non-residential receptors, including quiet areas.

4.3.18 For each type of receptor, subject to the screening distances identified, and based upon supplied plant information from engineers, the typical and highest monthly  $L_{pAeq,T}$  noise levels from construction activities have been calculated at the façade of all assessment locations, which are representative of a number of receptors in the study area.

4.3.19 The assessment results, impact criteria and significance criteria for the assessment of the scheme at residential and non-residential receptors are presented in Table 3 and Table 4 respectively

4.3.20 The construction activity resulting in highest forecast noise levels is reported in Table 3 and Table 4 for each assessment location and time period, where the highest forecast noise level from any individual construction activity is above  $L_{pAeq,T}$  40dB during the daytime and evening periods and  $L_{pAeq,T}$  35dB during the night-time. Where the highest forecast noise level from any individual construction activity is less than  $L_{pAeq,T}$  40dB during the daytime and evening or  $L_{pAeq,T}$  35dB during the night-time no activities have been reported.

4.3.21 The area around the construction work planned at Euston comprises numerous buildings with diverse uses. Information regarding the number and use of all sensitive receptors was based upon the best available data at the time of assessment. It is possible that in locations where effects are identified the number of affected receptors and the type of effect may vary. A worst case approach has been taken and wherever possible and the most sensitive likely receptor has been assumed.

4.3.22 In Table 3 and Table 4 the number of impacts represented column identifies the number of receptors likely to be subject to construction noise levels above the impact criteria. The assessment location itself may be representative of a greater number of receptors but due to a range of factors (including additional screening, building orientation and increased distance from the source of the noise) not all receptors represented would be likely to be impacted. Where no impact has been identified this column has been marked with '1'.

4.3.23 Explanation of the information within Table 3 and Table 4 is provided in Volume 5: Appendix SV-001-000, with the following additional notes:

	Where the significant effect column is highlighted then a significant effect is identified at the referenced community, or individual non-residential receptor
*	Significant effect – the quantitative impact methodology has identified either: <ol style="list-style-type: none"><li>1) no impact at this receptor but further information (see assessment) has identified that a significant effect is nonetheless likely; or</li><li>2) an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not give rise to a significant effect.</li></ol>
~	Significant effect - impacted dwellings which are either spatially remote from larger defined residential areas, or a small number of dwellings whose impact is not considered to represent the larger defined residential area, and as such are not considered to be part of a community significant effect.
A	Type of effect – adverse effect
S	Type of effect – significant adverse effect
NA	Type of effect – not generally an adverse effect
B	Type of effect – for non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-000
R	Type of receptor - residential
G	Type of receptor: (G1) theatres, large auditoria and concert halls; (G2) sound recording and broadcast studios; (G3) places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls; (G4) schools, colleges, hospitals, hotels and libraries; or (G5) offices and general commercial premises.

- T Receptor design – typical
- S Receptor design - special
- H Existing environment – high existing ambient noise levels: daytime level more than 75dB, evening-time level more than 65dB or night-time level more than 55dB L<sub>pAeq</sub> at the façade.
- NI Mitigation effect - identified as likely to qualify for noise insulation under the draft Construction Code of Practice (draft CoCP).
- ^ An impact which meets the noise insulation criteria at the worst affected floor of the assessment location, which, based upon further qualitative receptor information, (see assessment text) either does not give rise to a noise insulation effect or the number of receptors affected is lower.
- D,E,N Impact duration (months) – duration of impact during the day (D), evening (E) or night (N).

Table 3: Assessment of construction noise at residential receptors

Assessment location		Impact criteria			Significance criteria									Significant effect
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade		construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300											
519788	Euston Road, W	44/56 [>C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	H	-	-	-	
520315	Park Village East, North	55/67 [A]	<40/<40 [A]	52/65 [C]	Day: Retaining walls and abutments - daytime contiguous piling; and Night: Retaining walls and abutments - contiguous piling.	S	10	R	T	-	-	-	D 6; N 5	NI
520752	Eversholt Street (south)	68/80 [>C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	A	70	R	T	H	-	-	D 1	-
521033	Park Village East (Cubitt Court)	71/80 [B]	<40/48 [>C]	62/71 [>C]	Day: Demolition - demolition of buildings in the station approach; Evening: retaining walls and abutments - barrette construction; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	S	45	R	T	H	-	Y	D 38; N 34	NI
521556	Redhill Street	<40/46 [A]	<40/<40 [B]	<35/<35 [C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	-	-	-	-	-
522490	Augustus Street	64/78 [A]	<40/<40 [B]	<35/46 [C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast	A	75	R	T	-	-	-	D 1	-

Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700												
					planks.											
523758	Parkway	54/70 [A]	<40/<40 [A]	49/62 [C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of existing bridge piers.	S	4	R	T	-	-	-	D 1; N 3	NI	CSV01- Co2	
523809	Mornington Terrace, N	59/71 [B]	<40/<40 [C]	54/65 [>C]	Day: Park Village East - barrette cap, cantilevered road and parapet construction; and Night: Bridge construction - removal of bridge deck.	S	1	R	T	H	-	-	D 3; N 4	NI	CSV01- Co3	
523826	Mornington Terrace	67/81 [B]	<40/<40 [C]	51/63 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	45	R	T	H	-	-	D 3; N 3	NI	CSV01- Co3	
523935	Albert Street	50/62 [A]	<40/<40 [>C]	<35/44 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	H	-	-	-	-		
524286	Delancey Street	65/79 [B]	<40/<40 [C]	<35/41 [>C]	Day: Utility trenching - Utility works on each utility corridor, Night: Bridge Construction - Removal of bridge deck	A	80	R	T	H	-	-	D 1	-	*	

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700				Type of effect									
525979	Arlington Road	<40/52 [A]	<40/<40 [>C]	<35/39 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	H	-	-	-	-	-		
527860	Albany Street	69/78 [B]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	A	40	R	T	H	-	-	D 1	-	*		
528008	Park Village West, Regents Park Barracks	50/62 [A]	<40/<40 [A]	49/55 [C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	NA	-	R	T	-	-	-	-	-	-		
528051	Cumberland Terrace	69/79 [B]	<40/<40 [>C]	<35/38 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	A	15	R	T	H	-	-	D 1	-	*		
528192	Cumberland Terrace Mews	66/77 [B]	<40/<40 [>C]	<35/36 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	A	50	R	T	H	-	-	D 1	-	*		
528324	Park Village East, Regent's	44/57 [A]	<40/<40 [A]	37/46 [C]	Day: Utility trenching - sample utility works on each utility corridor; and	NA	-	R	T	-	-	-	-	-	-		

Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700			Type of effect									
	Park Barracks				Night: Bridge construction - installation of temporary supports, trusses and precast planks.											
528405	Albany Street	46/60 [A]	<40/<40 [A]	38/49 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - removal of existing bridge piers.	NA	-	R	T	-	-	-	-	-	-	
528585	Park Village East, Richmond Court	64/79 [B]	<40/<40 [>C]	54/63 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of existing bridge piers.	S	20	R	T	H	-	-	D 1; N 2	NI	CSV01- Co2	
528600	Park Village East, S	62/76 [B]	<40/<40 [>C]	54/65 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	25	R	T	H	-	-	D 2; N 3	NI	CSV01- Co2	
528624	Park Village East, Richmond Court	64/79 [B]	<40/<40 [>C]	55/64 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	40	R	T	H	-	-	D 3; N 11	NI	CSV01- Co2	
528830	Park Village East, N	70/82 [C]	<40/50 [>C]	62/75 [>C]	Day: Park Village East - barrette cap, cantilevered road and parapet construction; Evening: Retaining walls and abutments - barrette construction; and	S	4	R	T	H	-	Y	D 5; N 6	NI	CSV01- Co2	

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700													
					Night: Bridge construction - removal of bridge deck.												
528856	Park Village East, N	80/89 [C]	<40/49 [>C]	66/74 [>C]	Day: Park Village East - barrette cap, cantilevered road and parapet construction; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	2	R	T	H	-	Y	D 9; N 7	NI	CSV01- Co2		
528881	Park Village East, N	75/85 [C]	<40/46 [>C]	53/68 [>C]	Day: Cutting - excavation - major earthworks; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of existing bridge piers.	S	10	R	T	H	-	-	D 6; N 3	NI	CSV01- Co2		
528890	Park Village East, N	65/81 [C]	<40/<40 [>C]	47/58 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	2	R	T	H	-	-	D 1	NI	CSV01- Co2		
528900	Park Village East, N	72/81 [C]	<40/<40 [>C]	46/57 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	5	R	T	H	-	-	D 1	NI	CSV01- Co2		
528939	Park Village West	57/66 [A]	<40/<40 [A]	44/52 [C]	Day: On site traffic - construction traffic; and Night: Bridge construction - removal of bridge	A	40	R	T	-	-	-	D 2	-	CSV01- Co2		

Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700												
					deck.											
529017	Mornington Terrace	68/81 [B]	<40/<40 [C]	53/65 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	25	R	T	H	-	-	D 4; N 3	NI	CSV01- Co3	
529041	Mornington Terrace	68/81 [B]	<40/<40 [C]	58/69 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	25	R	T	H	-	Y	D 5; N 4	NI	CSV01- Co3	
529064	Mornington Street	66/79 [B]	<40/41 [C]	49/57 [>C]	Day: Utility trenching - sample utility works on each utility corridor; Evening: Retaining walls and abutments - Barrette construction; and Night: Bridge construction - removal of bridge deck.	S	35	R	T	H	-	Y	D 5	NI	CSV01- Co3	
529185	Mornington Terrace	68/84 [B]	<40/<40 [C]	57/68 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	20	R	T	H	-	Y	D 1; N 5	NI	CSV01- Co3	
529201	Mornington Terrace	67/81 [B]	<40/<40 [C]	64/72 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	35	R	T	H	-	Y	D 3; N 5	NI	CSV01- Co3	

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]		
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700													
529302	Mornington Place	65/81 [B]	<40/<40 [C]	53/65 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.			S	30	R	T	H	-	-	D 1; N 3	NI	CSV01- Co3
533032	Euston Road	66/77 [>C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.			NA	-	R	T	H	-	-	-	-	
533361	Doric Way	68/80 [>C]	<40/<40 [>C]	<35/37 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Demolition - demolish carriage shed in west sidings.			A	40	R	T	H	-	-	D 1	-	*
533433	Churchway	52/60 [A]	<40/<40 [B]	<35/<35 [>C]	Day: Demolition - demolition of buildings in the station approach.			NA	-	R	T	H	-	-	-	-	
533445	Eversholt Street, S	67/80 [>C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.			A	85	R	T	H	-	-	D 1	-	*
533673	Churchway	79/79 [A]	<40/<40 [C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.			A	80	R	T	H	-	-	D 1	-	*
533851	Eversholt Street	69/76 [C]	<40/<40 [>C]	<35/35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.			A	20	R	T	H	-	-	D 1	-	*
533958	Chalton Street	57/65 [A]	<40/<40 [C]	<35/35 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast			NA	-	R	T	H	-	-	-	-	

Assessment location		Impact criteria					Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700			Type of effect									
					planks.											
534200	Eversholt Street, Richard's House	71/82 [>C]	<40/<40 [>C]	44/59 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - removal of bridge deck.	S	60	R	T	H	-	-	D 5	NI^	CSV01-C01	
534286	Polygon Road	<40/44 [A]	<40/<40 [C]	<35/<35 [>C]	Day: Demolition - demolition of buildings in the station approach.	NA	-	R	T	H	-	-	-	-	-	
534557	Cobourg Street	77/87 [A]	50/56 [B]	46/54 [C]	Day: New utility corridor (Cobourg Street) - new utility corridor; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	15	R	T	-	-	-	D 33	NI	CSV01-C05	
534765	Cobourg Street	75/87 [A]	68/75 [B]	47/56 [C]	Day: New utility corridor (Cobourg Street) - new utility corridor; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	15	R	T	-	-	Y	D 37; E 15; N 2	NI	CSV01-C05	
534772	Starcross Street, London	70/80 [A]	65/71 [B]	48/57 [C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and	S	20	R	T	-	-	-	D 25; E 3; N 4	NI	CSV01-C05	

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700													
					Night: Bridge construction - removal of bridge deck.												
535017	Varndell Street, The Tarns	67/79 [C]	67/67 [>C]	52/62 [>C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	30	R	T	H	-	-	D 6	NI	CSV01- Co6		
535446	Hampstead Road, Cartmell House, N	73/83 [C]	58/65 [>C]	58/69 [>C]	Day: Bridge construction - construction of new carriageway; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	35	R	T	H	-	Y	D 12; N 2	NI	CSV01- Co6		
535454	Harrington Street, Conniston House	72/84 [B]	64/69 [C]	62/70 [>C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	20	R	T	H	Y	-	D 21; E 2; N 28	NI	CSV01- Co6		
535501	Harrington Street, Langdale House	73/86 [A]	61/71 [B]	62/70 [C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and	S	30	R	T	-	-	Y	D 29; E 1; N 34	NI	CSV01- Co6		

Assessment location		Impact criteria						Significance criteria							Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700												
					Night: Bridge construction - removal of bridge deck.											
535686	Cumberland Market	67/77 [A]	<40/<40 [B]	<35/35 [C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	A	1	R	T	-	-	-	D 1	-	*	
536408	Euston Road	65/76 [>C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	H	-	-	-	-		
539626	North Gower Street	63/79 [A]	<40/<40 [B]	<35/<35 [C]	Day: Utility trenching - sample utility works on each utility corridor.	A	1	R	T	-	-	-	D 1	-	*	
543159	Aldenham Street	49/61 [A]	<40/<40 [B]	<35/38 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	-	-	-	-	-		
544316	Albert Street	52/66 [A]	<40/<40 [>C]	38/49 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	A	50	R	T	H	-	-	D 1	-	*	
544328	Arlington Road,	46/61	<40/<40	<35/42	Day: Demolition - demolition of buildings in the station approach; and	NA	-	R	T	H	-	-	-	-		

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]		
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700				Type of effect									
	London	[A]	[>C]	[C]	Night: Bridge construction - removal of bridge deck.												
545266	Harrington Square	56/68 [C]	<40/<40 [>C]	45/55 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.			NA	-	R	T	H	-	-	-	-	
545326	Mornington Crescent	63/74 [B]	<40/<40 [>C]	61/68 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.			S	20	R	T	H	-	Y	D 4; N 13	NI	CSV01- C03
545365	Mornington Crescent	61/72 [A]	<40/<40 [B]	45/56 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.			S	15	R	T	H	-	-	D 10; N 5	NI	CSV01- C03
545455	Eversholt Road, N	67/75 [B]	<40/<40 [>C]	<35/35 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.			A	80	R	T	H	-	-	D 1	-	*
545616	Eversholt Street, N	67/79 [B]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.			A	150	R	T	H	-	-	D 1	NI	*

Assessment location		Impact criteria					Significance criteria							Significant effect	
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700											
545708	Ampthill Square	67/81 [C]	<40/<40 [>C]	56/66 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	20	R	T	H	-	-	D 2; N 2	NI	CSV01- Co4
545716	Ampthill Square	61/71 [A]	<40/<40 [C]	<35/45 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation (lifting in) of temporary utility bridges (transient elements).	A	20	R	T	H	-	-	D 8	-	CSV01- Co4
545744	Ampthill Square	63/75 [A]	<40/<40 [C]	59/69 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - removal of bridge deck.	S	10	R	T	H	-	-	D 22; N 37	NI	CSV01- Co4
545762	Barnby Street	65/77 [B]	<40/<40 [>C]	55/68 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	S	25	R	T	H	-	-	D 9; N 2	NI	CSV01- Co4
545877	Ampthill Estate	64/75 [C]	41/51 [>C]	52/67 [>C]	Day: Utility trenching - sample utility works on each utility corridor; Evening: Tunnel boring machine dismantle - tunnel boring machine dismantle; and Night: Bridge construction - removal of bridge deck.	A	80	R	T	H	-	-	N 1	NI	*

Assessment location		Impact criteria					Significance criteria							Significant effect	
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700											
545890	Ampthill Estate	71/80 [C]	<40/<40 [>C]	54/63 [>C]	Day: Bridge construction - construction of new carriageway; and Night: Bridge construction - Installation of temporary supports, trusses and precast planks.	S	80	R	T	H	-	-	D 6	NI	CSV01- Co4
545919	Ampthill Estate	68/79 [C]	60/67 [>C]	70/78 [>C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	80	R	T	H	-	-	D 9; N 29	NI	CSV01- Co4
546361	Mornington Place	45/62 [A]	<40/<40 [C]	<35/39 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - removal of bridge deck.	NA	-	R	T	H	-	-	-	-	-
547012	Hampstead Road	55/69 [C]	<40/<40 [>C]	46/57 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - removal of bridge deck.	NA	-	R	T	H	-	-	-	-	-
700384	Mornington Terrace	66/81 [B]	<40/44 [C]	50/58 [>C]	Day: Utility trenching - sample utility works on each utility corridor; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge	S	10	R	T	H	-	Y	D 3	NI	CSV01- Co3

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700													
					deck.												
700386	Park Village East, N	81/89 [C]	<40/51 [>C]	72/78 [>C]	Day: Park Village East - barrette cap, cantilevered road and parapet construction; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of existing bridge piers.	S	2	R	T	H	-	Y	D 7; N 7	NI	CSV01- Co2		
700387	Stanhope St, St Augustus House	72/84 [B]	<40/51 [>C]	64/72 [>C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	S	60	R	T	H	-	Y	D 46; N 35	NI	CSV01- Co6		
700388	Harrington Street, Langdale House	68/83 [A]	54/66 [B]	63/70 [C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	30	R	T	-	-	Y	D 56; E 1; N 40	NI	CSV01- Co6		
700389	Hampstead Road, Cartmell House, S	68/80 [C]	40/55 [>C]	59/68 [>C]	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and	S	35	R	T	H	-	Y	D 5; N 3	NI	CSV01- Co6		

Assessment location		Impact criteria						Significance criteria							Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700												
					Night: Bridge construction - removal of bridge deck.											
700393	Chester Place	70/78 [B]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	S	5	R	T	H	-	-	D 1	-	*	
700394	Robert Street, E end	75/80 [B]	56/61 [C]	<35/35 [>C]	Day: On site traffic - construction traffic; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	S	30	R	T	H	-	-	D 36	NI	CSV01- Co6	
710960	Albany Street	70/80 [C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	S	1	R	T	H	-	-	D 1	-	*	
710962	Camden High Street	<40/52 [C]	<40/<40 [>C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	H	-	-	-	-	-	
710964	Bayham Street	<40/48 [A]	<40/<40 [C]	<35/38 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	H	-	-	-	-	-	
710965	Cumberland Market	46/55 [A]	<40/<40 [B]	<35/<35 [C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	-	-	-	-	-		

Assessment location		Impact criteria					Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700												
710966	Robert Street	63/69 [B]	<40/<40 [B]	<35/<35 [C]	Day: On site traffic - construction traffic.	NA	20	R	T	-	-	-	-	-	-	
710967	Clarence Gardens	50/60 [A]	<40/<40 [B]	<35/35 [C]	Day: Demolition - demolition of buildings in the station approach.	NA	-	R	T	-	-	-	-	-	-	
710968	Camden High Street	48/64 [C]	<40/<40 [>C]	<35/41 [>C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	H	-	-	-	-	-	
710969	Bayham Street	<40/45 [A]	<40/<40 [C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	H	-	-	-	-	-	
710971	William Road	<40/52 [A]	<40/<40 [B]	<35/<35 [C]	Day: Demolition - demolition of buildings in the station approach.	NA	-	R	T	-	-	-	-	-	-	
710972	Stanhope Street	50/61 [A]	<40/<40 [B]	<35/38 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	-	-	-	-	-	-	
710973	Oakley Square	66/77 [B]	<40/<40 [>C]	<35/38 [C]	Day: Utility trenching - sample utility works on each utility corridor; and Night: Bridge construction - installation of temporary supports, trusses and precast planks	A	1	R	T	H	-	-	D 1	-	*	

Assessment location		Impact criteria						Significance criteria							Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700												
					planks.											
710975	Cranleigh Street	43/56 [A]	<40/<40 [B]	<35/37 [C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - installation of temporary supports, trusses and precast planks.	NA	-	R	T	-	-	-	-	-	-	
710976	Crowndale Road	42/55 [A]	<40/<40 [C]	<35/45 [>C]	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - removal of bridge deck.	NA	-	R	T	H	-	-	-	-	-	
710977	Chalton Street	<40/53 [A]	<40/<40 [C]	<35/<35 [>C]	Day: Utility trenching - sample utility works on each utility corridor.	NA	-	R	T	H	-	-	-	-	-	
710978	Chalton Street	48/60 [A]	<40/<40 [C]	<35/<35 [>C]	Day: Demolition - demolition of buildings in the station approach.	NA	-	R	T	H	-	-	-	-	-	

\* Impacts of less than 1 month duration are not generally considered significant.

Table 4: Assessment of construction noise at non-residential receptors

Assessment location		Impact criteria			Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade		construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300											
519788	Euston Road, University College Hospital	44/56	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>4</sub>	T	H	-	-	-	
519788	Euston Road, University College Hospital	44/56	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>5</sub>	T	H	-	-	-	
520315	Park Village East, Park Village Studio	55/67	-	-	Day: Retaining walls and abutments - daytime contiguous piling.	B	-	G <sub>2</sub>	T	-	-	Y	D <sub>3</sub>	CSV01-N1
520752	Eversholt Street offices, Travelodge hotel	68/80	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>5</sub>	T	H	-	-	D 2	CSV01-N2
521556	Redhill Street, Antiochian Orthodox Society	<40/46	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>3</sub>	T	-	-	-	-	
521556	Redhill Street, Primary School	<40/46	-	--	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>4</sub>	T	-	-	-	-	
521556	Redhill Street, offices	<40/46	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>5</sub>	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700											
522490	Augustus Street Healthy Living Centre and offices	64/78	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G5	T	-	-	-	D 1	-	*
523758	Parkway, offices	54/70	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G5	T	-	-	-	-	-	
523809	Mornington Terrace, public house	59/71	-	-	Day: Park Village East - barrette cap, cantilevered road and parapet construction.	B	-	G5	T	H	-	-	-	-	
525979	Arlington Road, offices	<40/52	-	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G5	T	H	-	-	-	-	
527860	Albany Street, offices	69/78	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G5	T	H	-	-	D 1	-	*
528008	Park Village West, Regents Park Barracks	50/62	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G5	T	-	-	-	-	-	
528051	Cumberland Terrace, Church	69/79	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G3	T	H	-	-	D 1	-	*
528405	Albany Street, Regent's Park offices	46/60	-	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G5	T	-	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect	
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700											
533032	Euston Road, Church Equippers	66/77	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>3</sub>	T	H	-	-	-	-	
533032	Euston Road, University UCL, Centre of Nanotechnology	66/77	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>4</sub>	T	H	-	-	-	-	
533032	Euston Road, Conference facilities, offices	66/77	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>5</sub>	T	H	-	-	-	-	
533361	Doric Way, Eversholt St, Academy and Media Film and TV	68/80	-	-	Day: Utility trenching - utility works on each utility corridor; and Night: Demolition - demolish carriage shed in west sidings.	B	-	G <sub>4</sub>	T	H	-	-	D 1	-	*
533361	Doric Way, Eversholt St, Academy and Media Film and TV	68/80	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>5</sub>	T	H	-	-	D 2	-	*
533445	Eversholt Street, shops	67/80	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>5</sub>	T	H	-	-	D 1	-	*

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700													
	and commercial properties																
533673	Churchway, Studio – Maverick television	79/79	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G2	T	H	-	Y	D 1	-		CSV01-N <sub>3</sub>	
533673	Churchway, the speech, Language and Hearing Centre	79/79	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G4	T	H	-	-	D 1	-	*		
533851	Eversholt Street, shops and commercial properties	69/76	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G4	T	H	-	-	D 1	-	*		
533958	Chalton Street, offices	57/65	-	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G5	T	H	-	-	-	-	-		
534200	Eversholt Street, St Marys Church	71/82	<40/<40	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G3	T	H	-	-	D 5	-	CSV01-N <sub>4</sub>		
534200	Eversholt Street, St Aloysius RC	71/82	<40/<40	-	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - removal of bridge	B	-	G3	T	H	-	-	D 5	-	CSV01-N <sub>5</sub>		

Assessment location		Impact criteria					Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700												
	Church				deck.											
534200	Eversholt Street, shops and commercial properties	71/82	-	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G5	T	H	-	-	D 5	-	CSV01-N6	
534557	Cobourg Street, Society of College National and University libraries offices	77/87	-	-	Day: new utility corridor Cobourg Street - new utility corridor.	B	-	G5	T	-	-	-	D 21	-	CSV01-N7	
534557	Cobourg Street, Wesley Hotel	77/87	-	-	Day: New utility corridor Cobourg Street - new utility corridor.	B	-	G4	T	-	-	-	D 21	-	CSV01-N8	
534765	Cobourg Street, Exmouth Arms Public House	75/87	-	-	Day: New utility corridor Cobourg Street - new utility corridor.	B	-	G5	T	-	-	-	D 11	-	CSV01-N9	
534772	Starcross Street, 204 North Gower Street Church-Euston Mosque	70/80	65/71	-	Day: Demolition - demolition of buildings in the station approach; and Evening: Retaining walls and abutments - barrette construction.	B	-	G3	T	-	-	-	D 33; E 3	-	CSV01-N10	
534932	North Gower Street, NHS	70/79	-	-	Day: Demolition - demolition of buildings in	B	-	G5	T	-	-	-	D 5	-	CSV01-	

Assessment location		Impact criteria						Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels			Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300	Night 2300- 0700													
	Margaret Centre				the station approach.											N <sub>12</sub>	
534932	North Gower Street, Maria Fidelis Convent School	70/79	67/69	49/58	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	B	-	G <sub>4</sub>	T	-	-	-	D 35; E 5	-	CSV <sub>01</sub> - N <sub>12</sub>		
535544	Augustus Street, Regents Park Children's Centre Nursery	72/84	-	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G <sub>5</sub>	T	-	-	-	D 12	-	CSV <sub>01</sub> - N <sub>13</sub>		
535017	Robert Street, The West Euston Partnership	67/79 [C]	67/67 [>C]	-	Day: Demolition - demolition of buildings in the station approach; Evening: Retaining walls and abutments - barrette construction; and Night: Bridge construction - removal of bridge deck.	S	-	R	T	H	-	-	D 6	NI	CSV <sub>01</sub> - N <sub>14</sub>		
535686	Cumberland Market, Education Centre	67/77	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G <sub>4</sub>	T	-	-	-	D 1	-	*		
536408	Euston Road,	65/76	<40/<40	-	Day: Utility trenching - utility works on each	B	-	G <sub>2</sub>	T	H	-	-	-	-	-		

Assessment location		Impact criteria					Significance criteria							Significant effect			
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			construction activity resulting in highest forecast noise levels		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect		
		Day 0700-1900	Evening 1900-2300	Night 2300-0700													
	School of Arts				utility corridor.												
536408	Euston Road, University College	65/76	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G4	T	H	-	-	-	-	-		
536408	Euston Road, offices and commercial property	65/76	<40/<40	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G5	T	H	-	-	-	-	-		
543159	Aldenham Street, school	49/61	<40/<40	-	Day: Demolition - demolition of buildings in the station approach; and Night: Bridge construction - Installation of temp supports, trusses and precast planks.	B	-	G4	T	-	-	-	D 5	-	*		
545266	Harrington Square, Hotel	56/68	<40/<40	<40/<40	Day: Utility trenching - utility works on each utility corridor.	B	-	G3	T	H	-	-	-	-	-		
545616	Eversholt Street, offices and commercial properties	67/79	-	-	Day: Utility trenching - utility works on each utility corridor.	B	-	G5	T	H	-	-	D 1	-	*		
547012	Hampstead Road, offices	55/69	-	-	Day: Demolition - demolition of buildings in the station approach.	B	-	G5	T	H	-	-	-	-	-		
700391	1-9 Melton	72/83	-	-	Day: Demolition - demolition of buildings in	B	-	G5	T	H	-	-	D 7	-	CSV01-		

Assessment location		Impact criteria			Significance criteria							Significant effect		
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade		construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700- 1900	Evening 1900- 2300											
	Street, offices			the station approach.										N15

\* Impacts of less than 1 month duration are not generally considered significant.

## Airborne sound: indirect effects

4.3.24 Construction road traffic associated with the Proposed Scheme will generate airborne noise. In the Euston area road traffic management measures on several roads will divert public traffic to other roads. Together, these two changes to road traffic patterns have been assessed for approximately 1,000 road links within 1km of the works, based on traffic modelling provided in this ES. Three stages in the construction programme were assessed (in 2017, 2019 and 2022) and changes in noise were calculated compared to a 2012 do-minimum situation (the existing circumstance without the works for the Proposed Scheme).

4.3.25 Based upon the supplied traffic information, the change in basic noise level (BNL) for a given road as a result of the presence of construction traffic and the diversion of public traffic has been predicted using the Calculation of Road Traffic Noise<sup>4</sup> (CRTN) methodology. The results at a reference distance of 10m from the edge of nearside carriageway are presented in Table 5. Where roads will be reduced to one way traffic or closed at stages in the works and noise reductions will result the impacts are not reported since they are beneficial environmental noise impacts.

4.3.26 In the Euston area many roads have low traffic speeds due to congestion. For traffic speeds below 20kph the CRTN procedure is not valid because noise levels can rise unpredictably in queuing situations. In these cases noise changes have been estimated (and rounded in the table) where possible, for example where noise levels from traffic in one direction can be reliably calculated or by assuming no change with a traffic speed of 20kph. There are a number of roads where a small proportion of additional traffic creates small noise increases, but below the significance criteria (a 3dB increase where existing sound levels are below  $L_{pAeq,16hr}$  65dB and a 1dB increase where existing sound levels are high i.e. above  $L_{pAeq,16hr}$  65dB). The results for potentially significant road links are presented in Table 5.

4.3.27 Explanation of the information within Table 5 is provided in Volume 5: Appendix SV-001-000, with the following additional notes:

 Where the significant effect column is highlighted then a significant effect is identified on nearby communities or individual receptors

**Change values**

 Yellow denotes a minor impact – a change of between 3 and 5dB or between 1 and 3dB where a high existing sound level is identified

 Orange denotes a moderate impact – a change of between 5 and 10dB or between 3 and 5dB where a high existing sound level is identified

 Red denotes a major impact – a change of more than 10dB or more than 5dB where a high existing sound level is identified

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<sup>4</sup> 'Calculation of Road Traffic Noise' (CRTN), Department of Transport and Welsh Office. HMSO, 1988.

**Table 5: Assessment of construction traffic noise levels**

Road name	Link	Future baseline sound level (dB)	Future baseline sound level + construction traffic (dB)	Change (dB)	Significant effect
		Daytime $L_{pAeq,16hr}$ 0700-23:00 free-field	Daytime $L_{pAeq,16hr}$ 0700-2300 free-field		
Stanhope Street	14654-14655	61.4	64.8/63.9/64.4	3.5/2.4/3.0	Yes
Albany Street (north of Robert Street)	14656-14136	67.6	67.6/69.0/68.9	0/1.4/1.3	Yes-High
Robert Street (west)	14655-14656	59.5	55.5/62.6/63.1	-/3.1/3.2	Yes
Robert Street (East)	14701-14655	64.3	66.0/63.7/66.6	1.8/-0.5/2.4	Yes-High
Eversholt Street	17011-14609	67.8	69.4/69.5/69.4	1.6/1.7/1.6	Yes-High
Barnby Street	14704-10511	58.6	67.1/67.1/67.1	8.5/8.5/8.5	Yes
Torrington Place	14325-14370	58.8	62.0/62.1/62.0	3.2/3.3/3.2	Yes
Albert Street	17001-17002	49.0	52.5/52.1/49.0	3.6/3.1/0**	Yes

\*Levels are rounded where estimates have been made due to low traffic speeds.

\*\* See discussion on Granby Terrace Bridge below, o' denotes road closed.

## 4.4 Assessment of significant effects

### Residential Receptors: direct effects – individual dwellings

4.4.1 Taking account of the avoidance and mitigation measures set out in the previous paragraphs, the following residential buildings are forecast to experience noise levels higher than the noise insulation trigger levels as defined in the draft CoCP. For daytime construction the trigger level is an equivalent continuous noise level of 75 dB<sup>5</sup> measured outdoors:

- St Richard's House (approximately 60 dwellings), on Eversholt Street;
- buildings containing approximately ten dwellings at Parkway at the junction with Park Village East;
- Cubitt Court, Tintern House, Silsoe House and Richmond House (approximately 145 dwellings), Park Village East;
- buildings containing approximately ten dwellings on Park Village East, near Mornington Street Bridge;
- buildings containing approximately 15 dwellings on Park Village East (north end);
- buildings containing approximately 90 dwellings on Mornington Terrace and Clarkson Row;
- buildings containing approximately 25 dwellings on Mornington Place;
- buildings containing approximately 25 dwellings on Mornington Crescent;
- Dalehead and Gillfoot residential blocks (approximately 160 dwellings), on the Ampthill Estate;
- four residential blocks (approximately 50 dwellings), Ampthill Square
- buildings containing approximately 30 dwellings on Cobourg Street and east end of Drummond Street;
- buildings containing approximately 20 dwellings on Starcross Street;
- buildings containing approximately 60 dwellings at the north end of Stanhope Street;
- Langdale and Coniston (approximately 80 dwellings) on Harrington Street; and
- Cartmel and The Tarns (approximately 100 dwellings) on Hampstead Road.

4.4.2 The mitigation measures, including noise insulation where necessary, in these buildings, will reduce noise inside all dwellings to a level where it should not significantly affect residents.

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<sup>5</sup> LpAeq,0800-1800 measured at the facade

## **Residential receptors: direct effects - communities**

4.4.3 With regard to noise outside dwellings, the assessment of temporary effects takes account of construction noise relative to existing sound levels.

4.4.4 In locations with lower existing sound levels, construction noise adverse effects<sup>6</sup> are likely to be caused by changes to noise levels outside dwellings. These may be considered by the local community as an effect on the acoustic character of the area and hence be perceived as a change in the quality of life. These adverse effects are considered to be significant when assessed on a community basis taking account of the local context.

4.4.5 The direct adverse construction noise effects<sup>6</sup> on the areas of the residential communities identified in the following paragraphs are considered to be significant.

### *Eversholt Street*

4.4.6 Temporary construction noise impacts are identified at residential dwellings along Eversholt Street and Barnby Street closest to the construction worksites. Taking account of the envisaged incorporated mitigation, the forecast construction noise will not in itself cause significant effects inside all dwellings. However, accounting for the impact on the noise amenity outside the dwellings, the number of impacts, the grouping of impacts and their duration, a significant effect is likely to occur at this group of dwellings, denoted by CSVo1-C1 in Table 3 and illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

4.4.7 Approximately 60 dwellings in St Richard's House in Eversholt Street nearest the main works are likely to experience construction noise levels greater than  $L_{pAeq,12hr} 75dB$  during the day for a continuous period exceeding one month. This is considered to be equivalent to the trigger levels for noise insulation specified in the draft CoCP.

4.4.8 Utility diversions on Eversholt Street may create noise levels above the daytime assessment criteria, but will be of sufficiently short duration that significant effects are not expected at the northern and southern ends of the street away from the main works.

### *Park Village East*

4.4.9 Temporary construction noise impacts are identified at residential dwellings along the full length of Park Village East and at the north end, Parkway and Park Village West. Taking account of the envisaged incorporated mitigation, the forecast construction noise will not be expected to cause significant effects inside all dwellings. However, accounting for the impact on the noise amenity outside the dwellings, the number of impacts, the grouping of impacts and their duration, a significant effect is likely to occur at this group of dwellings, denoted by CSVo1-C2 in Table 3 and illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

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<sup>6</sup> Further information is provided in Volume 5: Appendix SV-001-000.

4.4.10 Approximately 180 properties on Park Village East and Parkway are likely to experience construction noise levels during the day above  $L_{pAeq,12hr}$  75dB and/or 3dB above baseline where the baseline is above this level, for a continuous period exceeding one month. This includes Cubbit House and all properties on Park Village East. The main sources of noise impact are expected to be utility diversions, demolition of the existing retaining wall, construction of the Barrette wall, cantilevered road and parapet construction over periods of approximately six months.

4.4.11 The majority of these properties will also be impacted at night (construction noise levels above  $L_{pAeq,1hr}$  55dB and/or 3dB above baseline where the baseline is above this level) for a continuous period exceeding one month. The main sources of noise impact are expected to be demolitions close to railway operations, Mornington Terrace Bridge demolition and construction of new bridge piers.

### *Mornington Terrace*

4.4.12 Temporary construction noise impacts are identified at residential dwellings along the length of Mornington Terrace. Taking account of the envisaged incorporated mitigation, the forecast construction noise will not be expected to cause significant effects inside all dwellings. However, accounting for the impact on the noise amenity outside the dwellings, the number of impacts, the grouping of impacts and their duration, a significant effect is likely to occur at this group of dwellings, denoted by CSV01-C<sub>3</sub> in Table 3 and illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

4.4.13 Approximately 140 properties on Mornington Terrace are likely to experience construction noise levels during the day above 75dB ( $L_{pAeq,12hr}$ ) and/or 3dB above baseline where the baseline is above this level, for a continuous period exceeding one month. The majority of these will also be impacted at night (above 55dB  $L_{pAeq,1hr}$  and/or 3dB above baseline where the baseline is above this level) for a continuous period exceeding one month.

4.4.14 During the day the main sources of noise impact are expected to be contiguous piling of the retaining wall abutments, excavation, and Barrette wall construction (in Park Village East). In the south of this area demolitions and bridge works will also be major sources in the day and night.

### *Ampthill Estate*

4.4.15 Temporary construction noise impacts are identified at residential dwellings in the Ampthill Estate area. Taking account of the envisaged incorporated mitigation, the forecast construction noise will not be expected to cause significant effects inside all dwellings. However, accounting for the impact on the noise amenity outside the dwellings, the number of impacts, the grouping of impacts and their duration, a significant effect is likely to occur at this group of dwellings, denoted by CSV01-C<sub>4</sub> in Table 3 and illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

4.4.16 Approximately 210 properties, including 160 in the Gillfoot and the neighbouring block of the Ampthill Estate are likely to experience construction noise levels during

the day above 75dB ( $L_{pAeq,12hr}$ ) and/or 3dB above baseline where the baseline is above this level, for a continuous period exceeding one month. Approximately 220 will also be impacted at night (above 55dB  $L_{pAeq,1hr}$  and/or 3dB above baseline where the baseline is above this level) for a continuous period exceeding one month.

4.4.17 During the day the main sources of noise are expected to be demolition of buildings in the station approach, and construction of Granby Terrace and Hampstead Road Bridges. At night bridge demolitions and construction will also be major sources.

### *Cobourg Street*

4.4.18 Temporary construction noise impacts are identified at residential dwellings in the Coboug Street area. Taking account of the envisaged incorporated mitigation, the forecast construction noise will not be expected to cause significant effects inside all dwellings. However, accounting for the impact on the noise amenity outside the dwellings, the number of impacts, the grouping of impacts and their duration, a significant effect is likely to occur at this group of dwellings, denoted by CSV01-C5 in Table 3 and illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

4.4.19 Approximately 110 properties are likely to experience construction noise levels during the day above 75dB ( $L_{pAeq,12hr}$ ) and/or 3dB above baseline where the baseline is above this level, for a continuous period exceeding one month. The majority of these will also be impacted at night (above 55dB  $L_{pAeq,1hr}$  and/or 3dB above baseline where the baseline is above this level) for a continuous period exceeding one month.

4.4.20 During the day the main sources of noise impact are expected to be utility trenching, demolition of buildings in Melton Street and the station approach, construct Barrette retaining walls and abutments, major earthworks. Construction of Barrette retaining walls and abutments could create impacts in the evening. At night bridge works will be the main sources of noise.

### *Regents Park Estate*

4.4.21 Temporary construction noise impacts are identified at residential dwellings in the Regents Park Estate. Taking account of the envisaged incorporated mitigation, the forecast construction noise will not be expected to cause significant effects inside all dwellings. However, accounting for the impact on the noise amenity outside the dwellings, the number of impacts, the grouping of impacts and their duration, a significant effect is likely to occur at this group of dwellings, denoted by CSV01-C6 in Table 3 and illustrated in Map Series SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

4.4.22 Approximately 180 properties are likely to experience construction noise levels during the day above 75dB ( $L_{pAeq,12hr}$ ) and/or 3dB above baseline where the baseline is above this level, for a continuous period exceeding one month. These include 69 properties in Cartmell House, 20 properties in Conniston House and 60 properties in Langdale House that are expected to overlook the works for several years. Most of these properties will also be impacted at night (above 55dB  $L_{pAeq,1hr}$  and/or 3dB above

baseline where the baseline is above this level) for a continuous period exceeding one month.

4.4.23 During the day the main sources of noise impact are expected to be demolition of Eskdale House, Ainsdale House, Silverdale House and buildings in the station approach, major earthworks, Barrette retaining wall construction, construction of new bridge and carriageway. Construction of Barrette retaining walls and abutments could create effects in the evening. At night bridge works will be the main sources of noise.

### **Non-residential direct effects**

4.4.24 The area around the Euston works has various non-residential and commercial uses many of which are already exposed to high levels of road traffic noise. The assessment of potential noise impacts incorporates consideration of baseline noise levels, and in many cases construction noise impacts are not expected because construction noise will not significantly increase the existing noise levels. There are also many non-residential and commercial receptors on roads where utilities works will be carried out where noise impacts will be too short i.e. less than one month to be a significant effect.

4.4.25 Consideration of the likely noise level from construction of the Proposed Scheme, the sensitivity of the receptor, the magnitude of the impact, and other significance criteria as set out in Volume 5: Appendix SV-001-000, has resulted in identification of a likely significant effect on the following non-residential receptors:

- A significant daytime effect at the Park Village Studio on Park Village East represented by Assessment Location 523758 and effect CSVo1-N1 in Table 4. The daytime criteria are exceeded within a period of three months due to a range of works including utility trenching and Barrette pile cap breaking and cantilevered road construction.
- A significant daytime effect at the Travelodge hotel on Eversholt Street represented by Assessment Location 520752 and effect CSVo1-N2 in Table 4. The daytime criteria are exceeded within a period of two months due to a range of works including utility trenching and demolition, and road traffic noise is due to increase significantly during the works.
- A significant daytime effect is possible at the Maverick TV Studio on Churchway represented by Assessment Location 533673 and effect CSVo1-N3 in Table 4. The daytime criteria are exceeded only briefly during utility works, but given the sensitivity of the building this may be significant.
- A significant daytime effect at the St Marys Church, St Aloysius RC Church and commercial properties on Eversholt Street represented by Assessment Location 524200 and effects CSVo1-N4, CSVo1-N5 and CSVo1-N6 in Table 4. The daytime criteria are exceeded within a period of five months due to a range of works including utility trenching and demolition.
- A significant daytime effect at the offices in Cobourg Street and the Wesley Hotel in Euston Street represented by Assessment Location 534577and effects

CSVo1-N7 and CSVo1-N8 in Table 4. The daytime criteria are exceeded within a period of up to two years and six months due to a range of works including demolitions a new utility corridor, Barrette pile construction and major earthworks.

- A significant daytime effect at the Exmouth Arms Public House in Starcross Street represented by Assessment Location 534765 and effect CSVo1-N9 in Table 4. The daytime criteria are exceeded within a period of up to 11 months due to a range of works including demolitions a new utility corridor, Barrette pile construction and major earthworks.
- A significant daytime effect at the Euston Mosque in Starcross Street represented by Assessment Location 534772 and effect CSVo1-N109 in Table 4. The daytime criteria are exceeded within a period of up to two years and nine months due to a range of works including demolitions a new utility corridor, Barrette pile construction and major earthworks.
- A significant daytime effect at the NHS Centre and Maria Fidelis Convent School in North Gower Street represented by Assessment Location 534932 and effects CSVo1-N11 and CSVo1-N12 in Table 4. The daytime criteria are exceeded within a period of up to three years and five months due to a range of works including demolitions a new utility corridor, Barrette piling of retaining walls, major earthworks, and bridge construction.
- A significant daytime effect at the Regents Park Children's Centre nursery in Augustus Street represented by Assessment Location 535544 and effect CSVo1-N13 in Table 4. The daytime criteria are exceeded within a period of up to one year due to a range of works including demolitions a new utility corridor, major earthworks, and bridge construction.
- A significant daytime effect at the West Euston Partnership offices in Robert Street represented by Assessment Location 537017 and effect CSVo1-N14 in Table 4. The daytime criteria are exceeded within a period of five months due to a range of works including demolitions and construction of a new utility corridor.
- A significant daytime effect at the offices at 1-9 Melton Street represented by Assessment Location 700391 and effect CSVo1-N15 in Table 4. The daytime criteria are exceeded within a period of up to seven months due to a range of activities including demolition of buildings in the station approach, construction of a new utilities corridor and major earthworks excavation.

4.4.26 The quantitative assessment detailed in Table 4 has identified an impact at the school on Aldenham Street (represented by assessment location 543159). The construction noise level of 61dB<sup>7</sup> identified is based on the worst affected floor of the school building (fourth floor). Predicted construction noise levels at the third floor of the

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<sup>7</sup> L<sub>pAeq,0800-1800</sub> measured at the façade.

school are reduced by 6dB and would therefore be below baseline sound levels. Predicted construction noise levels at lower floors will be reduced further still. Therefore only classrooms directly facing the construction works on the fourth floor are likely to exceed the impact criteria. As the majority of the school building will not be subject to predicted construction noise levels above the impact criteria and taking into account additional local screening effects a significant effect has not been identified in this location.

### **Quiet areas**

4.4.27 No quiet areas have been identified in this area.

### **Indirect noise effects**

4.4.28 The main construction traffic will approach on Hampstead Road, and then enter the site initially through two main routes on the west side of the railway. One route will be via the Temperance Hospital compound and the other via Robert Street and Stanhope Street to an access ramp at the west end of Granby Terrace Bridge. Construction traffic flows are expected to rise to around 210 HGV trips/day in the second quarter of 2017, then drop to about 60 trips/day by November 2019 when the traffic routing will be diverted from Robert Street/Stanhope Street to the re-built Granby Terrace Bridge. The second and biggest peak of approximately 330 HGV trips/day is expected in the third and fourth quarter of 2020 dropping thereafter. This second peak during the main earthworks phase will arise when construction traffic is re-routed along Granby Terrace Bridge to Hampstead Road Bridge after November 2019 (mitigating the impact of construction traffic through the Regents Park Estate).

4.4.29 Taking account of incorporated mitigation the following likely indirect construction noise or vibration residual significant effects have been identified for the Proposed Scheme:

- Increases in road traffic noise at properties on Stanhope Street north of Robert Street, including from the addition of HGVs serving the site up to November 2019;
- Increases in road traffic noise at properties on Robert Street, from Hampstead Road to Albany Street, including from the addition of HGVs from the Regents Park Holding Area and those serving the site up to November 2019;
- Increases in road traffic noise at properties on Albany Street, from Parkway to Robert Street from the addition of HGVs serving the site from the Regents Park Holding Area from 2018;
- Increases in road traffic noise at properties on Eversholt Street, from the Euston Road to the site entrance off Barnby Street, including the addition of HGVs serving the site;
- Increases in road traffic noise at properties on Barnby Street, including the addition of HGVs serving the site;
- Increases in road traffic noise at properties on Torrington Place due to traffic

diverting to avoid the closure at Gordon Street; and

- Increases in road traffic noise at properties on Albert Street north of Mornington Street due to traffic diverting to avoid the closure of Mornington Street Bridge.

### *Cumulative effects from the Proposed Scheme and other committed development*

1.1.1 This assessment has considered the potential cumulative construction noise effects of the proposed scheme and other committed developments (see Section 2.1).

1.1.2 There are a number of potentially noise-sensitive committed developments in this area. However, these will come forward on sites where existing sensitive receptors are located. These existing receptors have been considered as part of this assessment and although the committed developments may result in changes to the number of impacts identified no additional significant effects have been identified.

1.1.3 There are a number of developments in the area that could result in cumulative construction adverse noise or vibration effects at nearby receptors if they were to be built at the same time as the Proposed Scheme:

- Odeon Cinema Site, Grafton Way, medical/health care uses or mixed use development including housing; and
- King's Cross Railway Lands, a major mixed use development including residential.

4.4.30 These developments are sufficiently far from the Euston Station works that additive effects on the predicted construction noise levels are unlikely. The potential cumulative impact from committed developments affecting road traffic noise in conjunction with the road traffic noise effects from the construction and operation of the Proposed Scheme have been considered as part of this assessment. This has been achieved by including changes in traffic predicted as a result of the committed developments within the traffic data used for the noise assessment

## 5 References

British Standard 5228: '*Code of practice for noise and vibration control on construction and open sites: Part 2: Vibration*', British Standards Institution, 2009.

'*Calculation of Road Traffic Noise*' (CRTN), Department of Transport and Welsh Office. HMSO, 1988.

Control of Pollution Act 1974 (c.40). London, Her Majesty's Stationery Office.